

# **ERGONOMICALLY SHAPED HAND HELD DEVICE**

## **Cross-Reference**

5 This application is a continuation-in-part of co-pending  
U.S. Application No. 09/075,028, filed October 12, 2001,  
the disclosure of which is hereby incorporated herein by  
reference.

## **ABSTRACT OF THE INVENTION**

The present invention is directed towards a hand held  
scrubber or polisher possessing an ergonomically designed  
handle, a base plate to which the handle is attached, and a  
15 cleaning element that can be removed and replaced. The  
invention provides for a device that can be used with both  
comfort and efficiency, in the process of cleaning. Both  
the handle and the cleaning element can be changed for  
varying jobs or after they become worn or uncomfortable.

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## **THE FIELD OF THE INVENTION**

This invention relates to the field of using hand held  
devices for cleaning, scouring and polishing a variety of  
25 surfaces that can be found in household, commercial,  
industrial or hospital applications, including utensils,  
floors, walls, ceilings, and other various flat or curved  
surfaces. The typical hand held cleaning devices often  
suffer from a lack of proper ergonomic design and the lack  
30 of a replaceable cleaning surface. The object of the  
invention, therefore, is to provide a more efficient hand  
held cleaning instrument that is both easier and more

comfortable to use, as well as being less wasteful of material that would have to be discarded.

### **BACKGROUND OF THE INVENTION**

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A major drawback with use of conventional hand held cleaning and polishing devices arises from their being generally more effective the more "elbow grease", or the more pressure, that is applied. This "pressure" must typically be applied for relatively long periods of time while a circular or back and forth motion is used. People cleaning or polishing with conventional, nonergonomic handled devices tire and blister more easily than they would using an ergonomic device, and therefore cannot uniformly maintain their maximum potential pressure on the device surface during the entire cleaning or polishing stroke and cannot clean or polish with optimum efficiency. Therefore, the need for a cleaning device with an ergonomically shaped handle can be seen.

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Another important drawback with use of conventional hand held cleaning devices is that in the course of cleaning various surfaces all such devices receive a great deal of pressure and wear on their cleaning surface. This wear can cause the device to loose its efficiency during any period of extended use and require frequent replacement. Having to replace the entire cleaning instrument, including its otherwise still functional handle, is necessarily costly as well as environmentally undesirable. Therefore, the need for a cleaning device with a replaceable cleaning surface can be seen.

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U.S. Patent No. 3,090,064 to Garret describes a cleaning device with a handle for detachable scouring pads that are made from steel wool, brass wool, plastic or the like. A device has been described which has a vertical handle fixed  
5 to a circular base in which attachment of the scouring pad is achieved by employing a series of teeth like metal prongs attached to the bottom of the base in a circular fashion near its perimeter. The prongs are bent parallel to the base so that they can penetrate and hold a scouring  
10 pad which is pressed against the base and rotated in a direction toward the points of the teeth. The teeth or prongs, being large in size and few in number, are unsuitable for penetrating and holding softer cleaning pads such as sponges and felt pads. This method of attachment  
15 which employs horizontal teeth also suffers from the disadvantage that the scouring pads can come loose during the application of the circular motions and horizontal forces frequently applied during scouring and cleaning flat surfaces. The handle of the prior art is vertical and  
20 therefore not ergonomically correct for the constant pressure required during the use of the device. A handle of this kind will force the use to grasp it and apply pressure in an unnatural direction. The present invention allows the user to grasp the handle with a hand orientation  
25 similar to that which is used to scrub with a pad that does not have a handle.

U.S. Patent No. 3,346,904 to Armstrong teaches the use of detachable felt pads placed on the polishing heads of glass  
30 polishing machinery. The means of attachment described involves attaching a textile fabric or sheet, which presents numerous, upstanding loops of flexible, resilient

fiber that has been cut to form hooks, to the polishing heads of glass polishing machinery. Such hooks being capable of engaging numerous uncut, upstanding loops hanging from a woven textile sheet affixed to the back of a felt polishing pad by means of stitching stapling or an adhesive. The flexible, resilient nature and large number of the hooks and loops permits engagement and disengagement when they are pressed together or pulled apart. Other feature of this invention include the pad covering substantially the same area as the polishing head, as well as the center of the polishing head, and the center of the sheet on the back of the pad being left open an unattached so that the felt pad can move up and own providing a pumping action when the head is raised or lowered on the glass being polished. The open unattached area beneath the paid is accomplished either by using ring shaped sheets, open at their centers, in the head and the paid, or by using a series of radially extending, opposing strips and patches angularly arranged only the pad and head, rather than a continuous sheet covering the entire surface of each. This device is intended for use in factory setting, on a fixed floor or bench-mounted machine to polish movable glass objects and not for manual cleaning or polishing.

U.S. Patent No. 4,555,705 to Graham describes a hand held, manually operated cleaning device or application with a detachable cleaning pad. A device is described which employs, for the purposes of cleaning pad attachment to the applicator, a multiplicity of small, spaced apart impaling spikes, or points, integrally molded with and part of the otherwise flat surface of the applicator's head. These points or spikes are further described as having outwardly

extending burrs at their tips, extending at roughly right angles to the spikes, which are able to penetrate and engage a layer of fibers on one side of the cleaning pad when pressed against it. These burrs thereby prevent the lateral movement of the pad. A feature of this device is its spikes or points with extending burs being molded part of the applicator head as opposed to being attached to the head with an adhesive, as part of a separate sheet. A significant limitation lies in the handle design which is described as elongated, therefore only being capable of being grasped from the side, and also its dependence for flexibility of motion on the use of a pivot. This pivot only provides flexibility in its back and forth motion and would be difficult to use in the circular or side to side motions required for effective cleaning, scouring and polishing. The pad described for use with this device is only a two-layer pad including the layer of fibers for attachment. The present invention allows for both a wider range of motion, and a thicker more durable pad.

U.S. Patent No. 5,003,659 to Paepke describes circular hand held, manually operated cleaning device with an essentially flat topped handle projecting from the top surface of the device's base. The handle is contoured so that the handle narrows as it approaches the base, thereby presenting a channel between its flat top and base to accept at least part of a thumb and a finger. The handle is therefore capable of being grasped by the hand when the palm is placed across its essentially flat top, which has also been hollowed out to create an opening in which to fit a frictionally fitting, elongated extension handle. The device also employs detachable pads, that are attachable to

the bottom surface of the devices' flat base, which has  
glued to it a circular sheet bearing a plurality of hook  
like elements. These hooks are capable of attachment to a  
looped fastener fabric, which is in turn attached, by  
5 adhesive or otherwise, to a water absorbed sponge.

Attachment therefore occurs much in the same manner as when  
"Velcro" is employed to obtain attachment. The hooks are  
also described as being capable of direct attachment to the  
loops of a stainless steel loose curled sponge. This  
10 device is limited in its use because its flat top becomes  
uncomfortable when a person who is grasping it has to apply  
any significant amount of downward pressure and use it for  
a long period of time. The extension handle is also  
limited, because its angle to the cleaning surface limits  
15 the downward pressure it can accept.

U.S. Patent No. 5,915,869 to Agosto discloses an Ergonomic  
Cleaning Apparatus with Multiple Cleaning Surfaces that is  
the shape of a pyramid or tetrahedron and has a tetrahedral  
20 shaped core, which is made of squeezable fluid absorbing  
substance such as sponge. Multiple triangular shaped and  
replaceable scrubbing surfaces are attached to the various  
faces of the core. The scrubbing surface is attached to  
the core with hot glue for permanency, stitching, as well  
25 the trademark product "Velcro" which make these surfaces  
easily detachable. The scrubbing surfaces contemplated  
include different types of scouring pads, terry cloth,  
copper wool, steel wool and various sponge materials. The  
disadvantages of the device are several. The tetrahedral  
30 shape, composed of triangular pieces, does not adequately  
conform to the inner surface of the grasping hand reducing  
hand comfort and efficiency. The detachable feature of

these cleaning surfaces, being mounted on a relatively soft and malleable core, are a further limitation since they are being directly held by the grasping hand and, therefore, are more prone to detachment as the hand moves back and forth during cleaning strokes. The user's hand being in more direct contact with any detergent or other fluids on these surfaces, as carried by the absorbent core, will necessitate the user's wearing of protective gloves at essentially all times.

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U.S. Patent No. 5,493,749 to Zayas discloses a hand held device with a detachable sponge exclusively designed for applying and removing, from the skin, topical compositions such as makeup, lotions and other beauty aids. Its object to provide a sanitary and pleasurable means for applying and removing such cosmetic materials. It is described as consisting of a handle, a base, a sponge and a cap that can fit over the sponge when it is not in use. The handle, the purpose of which is said to be precision, is elongated, projecting from the base at any angle from 0 to 180 degrees, with 30 to 60 degrees preferred. The replaceable sponge is attached to the bottom of the base by means of the sponge having on one of its sides one part of a two component fastening device, such as a clip, snap or "Velcro" (hook and loop material) strip. The other part of the fastening device is attached to the center of the bottom of the base of the handle. When the sponge is attached to the base and not in use, it can be covered by the cap, which fits into slots on the outer perimeter of the base. When a "Velcro" strip fixed to the base is used for attachment, it is described as being an approximately 0.5 inch square on an approximately 1.5 inch square base.

The surface area provided for attachment of the cleaning sponge is smaller than the sponge surface, and the elongated handle has no ergonomic features, as does the present invention. The Zayas invention is designed  
5 primarily for precision and is not useful for heavier duty cleaning for which the present invention is designed.

The prior art does not attempt to solve the problems that the present invention is designed to answer. The present  
10 invention is directed towards an ergonomically shaped hand scrubber with a replaceable cleaning surface. The present invention provides a more comfortable, economical, and efficient surface cleaning device. It should be clear to one skilled in the art, that the, above discussed, prior  
15 art is based for the purposes of illustration.

#### **SUMMARY OF THE INVENTION**

It is an object of the present invention to provide an  
20 ergonomically shaped hand held cleaning device.

Another object of the present invention is to provide for an ergonomically shaped hand held cleaning device comprising an ergonomically shaped handle, wherein said  
25 handle is connected to a base plate.

Another object of the present invention is to provide for an ergonomically shaped hand held cleaning device comprising a detachable cleaning member that can be changed  
30 without changing said handle.



Another object of the present invention is to provide for an ergonomically shaped hand held cleaning device comprising a detachable connection between said handle and said cleaning member, wherein said connection further  
5 comprises T-shaped or hook-like projections.

Another object of the present invention is to provide for an ergonomically shaped hand held cleaning device comprising a connection between said handle and said base  
10 plate, wherein said connection allows for the comfortable laying of fingers therein.

Another object of the present invention is to provide for an ergonomically shaped hand held cleaning device  
15 comprising a connection between said handle and said base plate, wherein said connection allows for the removal and replacement of different shaped handles.

Other objects of the present invention will become apparent  
20 from the foregoing description. It should be understood by one skilled in the art that the terms and identifications used by the applicant should not be interpreted as limiting the invention to a particular embodiment or object described above. Only the prior described above contains  
25 possible limitations to the present invention.

#### **BRIEF DESCRIPTION OF THE DRAWINGS**

The following description of preferred embodiment of the  
30 present invention will be better understood when read in conjunction with the appended drawings. It should be

understood, however, that the invention is not limited to the precise arrangements shown in which:

Fig. 1 is a side view of one embodiment of the invention in  
5 which the handle is in the shape of sphere;

Fig. 2 is a perspective view of the same embodiment as in  
fig. 6, without the cleaning member attached;

Fig. 3 is a side view of the cleaning member unattached to  
the base plate;

10 Fig. 4 is a top view of the invention looking down on it  
from above in which the tope of the ergonomic handle, the  
base to which it is attached, and the outline of the  
cleaning member can be seen;

Fig. 5 is a side view of the invention showing the space  
15 between the handle and the base, which is designed to  
accept at least part of one or more of the curved fingers  
of the hand when the handle is grasped;

Fig. 6 is an oblique view of the invention as seen from  
above, looking downward at an angle towards one of its  
20 corners;

Fig. 7 is a view of the invention in which the handle at  
the base to which it is attached is shown as separated from  
the cleaning member;

Fig. 8 is an oblique view of the invention from the same  
25 vantage point as in Fig. 3 in which the handle and the base  
are shown as separated from the cleaning member;

Fig. 9 is a bottom view of the base plate, facing the  
receptor T projections; and

Fig. 10 is a side view of the base plate, showing a side  
30 view of the T projections.

## PREFERRED EMBODIMENT OF THE INVENTION

The present invention is a hand held scrubber possessing an ergonomically designed handle with means of attachment to a  
5 disposable cleaning member such as a sponge, felt pad, scouring pad, polishing pad or matte. The means of attachment of the handle to the cleaning member further comprises a base plate, which is attached to the bottom surface of the handle by a column that provides sufficient  
10 space to accept part of the fingers of a hand grasping the handle. This column is located and connected to the top surface of the base plate. The base plate has on its bottom surface means of attachment to the top of the cleaning member. The column and the base plate can be made  
15 so as to be permanent parts of the handle or be detachable from it.

Figs. 1 and 2 shown the preferred embodiment of the invention wherein said ergonomically correct handle 1 is  
20 the shape of a sphere. The spherical shape of said handle 1, provides for a more comfortable gripping mechanism. Said space 4, between the handle 1 and said base plate 2, is even greater with the handle 1 in the shape of a sphere. This allows for the fingers of the user's hand to better  
25 curl under the handle 1 and allow said user a better overall grip. Fig. 6 shows the invention from the side view. In this figure, as well as in fig. 8, said cleaning member 3 is seen to be further comprised of an upper attaching surface 6, a sponge-like inner surface 7, and a coarse  
30 cleaning surface 8. Fig. 7 shows a perspective view of the invention without said cleaning member 3 attached. Said connecting projections 5 can be seen in this drawing.

Fig. 4 and Fig. 5 show the ergonomic shaped handle 1 attached to the approximate center of the top surface of a base plate 2. In Fig. 5, a space between the handle 1 and the base plate 2 is clearly shown, revealing that it is designed to be capable of accepting part of the user's fingers when grasped from above. This space is created by a column 9 that connects the handle to the base plate.

10 In Figs. 1,3,4, and 5 a cleaning member 3, in these particular views a sponge, can be seen to be attached to the bottom of the base plate and extending somewhat beyond the outer perimeter of the base to facilitate its reaching into corners and under overhanging structures. In Figs.

15 2,7, and 8 the location of means of attachment, such as hooks and T shaped projections 5 that project downward from the handle's base plate 2 which can either be an integral part of the handle's base plate or attached to it, are shown as well as the location of the surface bearing a

20 multiplicity of small openings like hoops or hooks 6 of the cleaning member or matte 3 to which they are attachable. The invention is clearly illustrated in Fig.3 as having a three layered cleaning member 3 with a strong, fibrous, and relatively course surface 8 attached to the bottom surface

25 of a softer more fluid absorbent sponge pad on matte 7 above which is the small opening containing upper surface 6. The advantages this embodiment offers are the ability to offer the simultaneous use of an efficient scrubbing, scouring, or polishing surface together with the use of an

30 absorbent material that can take up, hold, and release detergents or other fluids together with a secure means of attachment to the handle.

In one embodiment, the handle 1 is made of molded plastic, is roughly oblong in shape, and is designed to have a curved top surface that is specifically designed to conform to and to comfortably fit the inside surface of a grasping hand. A space or channel 4 is created between the handle 1 and the base plate 2 by a connecting column 9. This space is capable of accepting at least part of the ends of the fingers of the user's hand when the handle is grasped from above. The space, in combination with the curved surface of the handle, enables the user to obtain both a firm and ergonomically comfortable grip on the invention. The handle 1 is connected through the column to the approximate center of one side of the base plate 2. By connecting the handle to the approximate center of the base plate, the pressure from the user's hand is distributed more uniformly across the opposite side the base plate, to which the cleaning element is attached.

Attachment of the cleaning element is achieved by a multiplicity of small, relatively stiff, hook-like or T-shaped projections 5. These projections project downwards from the base plate 2 and work in conjunction with the cleaning member 3. The connection side of said cleaning member 3 is made of a fibrous material that accepts said projections, and holds the remainder of the member onto the handle. This connection allows for removal and replacement of the cleaning member 3, when it becomes worn, without replacement of the handle. The cleaning member 3, as shown in Figs. 1,4,5, and 6, is of somewhat larger dimensions than that the base plate. These larger dimensions and the fact that it is made of less rigid material than the plate,

allow the portions of the cleaning member extending beyond the plate to fit and reach into corners and under overhanging projections.

5 Turning back to Figure 6, the bottom surface 8 of the cleaning member is disclosed. The layer 8 is used to clean surfaces such as ceramic, porcelain, cook tops and chrome. A material used for the cleaning layer 8 is, for example, a light, medium or heavy duty scouring pad.

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The thickness of cleaning layer 8 provides a surface that is abrasive enough to clean the required surfaces. For example, the thickness of layer 8 is one quarter of an inch. The surface area of the cleaning layer 8 is the same  
15 as the sponge layer 7, where the overall surface area is designed for comfortable use. For example, the length of the cleaning layer 7 is approximately six inches and the width is approximately four inches.

20 Remaining with Figure 6, the top layer 6 of the cleaning member 3 is disclosed. The layer 6 creates a gripping connection between the cleaning member 3 and the base plate 2. A material used to fabricate the layer 6 is Female Velcro, or Loop Velcro. The material comprises a large  
25 quantity of synthetic loops utilized for attaching the material to another surface that is capable of gripping the loops.

The thickness of the gripping layer 6 provides a strong  
30 connection between the cleaning member 3 and the base plate 2. The connection must withstand periodic attachment and detachment of the cleaning member 3 from the base plate 2.

For example, the thickness of the gripping layer 6 is approximately an eighth of an inch. The surface area of the gripping layer 6 is the same as the course surface 8 and sponge surface 7 of the cleaning member 3.

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Turning to Figures 9 and 10, an array of T ("Tee") projections 5 are disclosed. The projections are used to connect the gripping layer 6 of the cleaning member 3 to the base plate 2. The projections are fabricated from the same material as the handle. For example, the projections are fabricated from plastic. The projections are injection molded integrally with the handle.

Each T projection has a top segment 10. The top segment 10 is used to grab the gripping layer 6 of the sponge 3. The top segment 10 has a first and second opposing extensions 11, and 12. Each extension has a relatively sharp distal end 13 and 14. The sharp distal end clings to the fabric of the gripping surface 6 of the sponge by being automatically inserted into the random loop fibers on the gripping surface 6 when placed against the loop fibers. The sharp ends 13 and 14 are separated by a distance that assures that the top segment 10 will grip the loop fibers of the gripping layer 6 so that the sponge 3 will remain attached to the base plate 2. For example, the distance between ends 13 and 14 is an eighth of an inch.

Remaining with Figures 9 and 10, the top segment 10 has attachment points 15 and 16 through which the extensions 13 and 14 are respectively attached to the T projection 5. Each extension 13 and 14 becomes thicker towards the attachment point 15 and 16 on each projection 5. The

thickening configuration increases the durability of the extensions 11 and 12 by counteracting the bending and shearing forces placed on the tips 13 and 14 from the loop fibers of the gripping layer 6. The thickening configuration causes the top segment 10 to be at least semi rigid, or stiff, and maintain the predefined shape during use. The shape of the extension 13 or 14, between sharp ends 13 or 14 and, respectively, thicker centers 15 or 16, is triangular. Alternatively, the shape of the extensions is parabolic. As an example, the ends 15 and 16 are many dozen times thicker than the points 13 and 14, because points 13 and 14 have almost no thickness.

In use, the projections 5 are capable of gripping more surfaces than Female Velcro. For example, projections 5 are capable of gripping the loop surface of a common scouring pad. Accordingly, handle 1 is capable of gripping a single scouring pad, or a sponge having scouring pads on either side rather than being flanked by a scouring pad and Female Velcro.

Continuing with Figures 9 and 10, an intermediate section 17 is disclosed. The intermediate section 17 is shaped as a column and connects the top segment 10 of the projections 5 with the base plate 2. The column is integrally fabricated into the handle 2 along with the projections 5. The column 17 separates the top segment 10 of the projections from the base plate 2 by a distance that assures the tips of the projections 11 and 12 will slip into the loop fibers of the cleaning member 3. For example, the distance, from the base of the column to the top of the projections 5, is an eighth of an inch or



roughly the same dimension as the distance between end tips 11 and 12 on the projections 5.

The column section 17 becomes thicker towards the attachment point to the base 2. The thickening configuration increases the durability of the projection 5 by counteracting the bending and shearing forces placed on the top section 5 from the loop fibers of the gripping layer 6. The thickening configuration causes the column 17 to be semi rigid and maintain the predefined shape during use. The cross sectional shape of the column 17, between the top section 5 and the base 2, is trapezoidal. Alternatively, the cross sectional shape of the column is parabolic. As an example, the thickness of the column at the connection to the top section 5 is double that of the thickness of the column at the base 2.

The array of projections consists of enough projections to assure a connection with the cleaning member 3. For example, the array of projections consists of fifteen rows of projections, where each row has between six and nineteen projections 5. The number of projections is limited only by the overall size of the projections as compared to a predetermined density of the projections and the size of the base plate 2. The predetermined density of projections has an upper limit, above which does not significantly increase the gripping strength between the projections and the cleaning surface. The predetermined density changes for different types of cleaning surfaces.

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The column, the base plate and hook-like or T shaped projections are capable of being injection molded out of

the same plastic, in one piece at the same time. This would result in the strongest connection between the handle and the base plate. This would be more suitable for tough heavy cleaning jobs, where high pressure scrubbing is required. In another embodiment the handle can be made separately and attached to the top of the column with a hot melt adhesive. Once again, this provides a strong connection, but also a limited design. In another embodiment, the handle can be connected to the column through a detachable mechanism such as screw-on or snap-on means. The advantage that an interchangeable handle offers is that certain handle designs are more suitable for certain tasks. The ability to change handle design, to match a certain tasks, can relieve muscle strain and reduce tiring.

In the foregoing description of the invention, reference to the drawings, certain terms, have been used for clarity, conciseness and comprehension. However, no unnecessary limitations are to be implied from or because of the terms used, beyond the requirements of the prior art, because such terms are used for descriptive purposes and are intended to be broadly construed. Furthermore, the description and illustration of the invention are by way of example, and the scope of the invention is not limited to the exact details shown, represented, or described.

While the present INVENTION has been described with reference to the specific embodiments, it is understood that the invention is not limited but rather includes any and all changes and modifications thereto which would be

apparent to those skilled in the art and which come within the spirit and scope of the appended claims.